

## **Fairfax County Stormwater Needs Assessment Project: Stormwater Program Discussion Paper**

### **I. Introduction**

In order to translate the County's current and projected level and extent of stormwater service into a discussion on the stormwater program, the following paragraphs outline the County's current program from a service delivery, project development and implementation, and regulatory compliance perspective. The discussion also includes an overview of what the County stormwater program needs to accomplish based on information collected to date, including an assessment of potential future program elements, be they new or existing program components that may be altered or enhanced in some fashion. As mentioned in the Level and Extent of Service paper, the County's service level philosophy is likely to change gradually over time as the program is refined and expanded to address mandates from the Federal and State on water quality protection and dam safety. In addition, physical system operation and maintenance standards will also adjust as community needs and expectations are met. This discussion lays out the expected level and extent of County stormwater service in terms of the County's current program as well as anticipated and potential future programs.

### **II. Current Stormwater Management Program**

Fairfax County's Department of Public Works and Environmental Services (DPWES) currently provides a variety of stormwater management services. DPWES is a multi-faceted agency providing the County with a wide range of services including construction of roads and utilities, construction and maintenance of County facilities and infrastructure, and enforcement of state and local codes relating to building planning and construction, land development, transportation, waste management, and other environmental protections. The Department contains six primary business lines, including Capital Facilities (CAP), Facilities Management (FAC), Land Development Services (LDS), Solid Waste Management (MSW), Wastewater Management (WWM), and Stormwater Management (STW). The STW business line includes the two line divisions that handle the vast majority of all County stormwater management services the Stormwater Planning Division (SWPD) and the Maintenance and Stormwater Management Division (MSMD).

#### ***Stormwater Management Divisions***

Supported by other county, regional, and state agencies, the stormwater management business unit, and SWPD and MSMD in particular, are charged with "developing, promoting, and implementing strategies that protect the County's stormwater infrastructure and preserve and improve the natural ecosystem". Their mission has three key components:

- To develop and maintain a comprehensive watershed and infrastructure program that will protect public health and safety and will enhance the quality of life in Fairfax County;
- To plan, design, construct, operate, and maintain the infrastructure in compliance with all government regulations; and



- To be responsive and sensitive to the needs of the County's residents, customers, and public partners.

The Maintenance and Stormwater Management Division (MSMD) addresses maintenance and rehabilitation on the existing stormwater infrastructure. Maintenance services are provided in an effort to manage the capture and conveyance of stormwater runoff in order to mitigate flooding and improve the water quality of local water bodies. MSMD is responsible for the inspection and oversight of public and privately maintained stormwater management facilities, as required by state and federal water quality permits and provides support during emergency response (mostly flooding) operations.

The Stormwater Planning Division (SPD) addresses stormwater planning, monitoring, capital project design, and floodplain management services. This division is responsible for compliance and reporting related to the National Pollutant Discharge Elimination System (NPDES) stormwater permit. SPD also coordinates state mandated dam safety operation and maintenance certificates, emergency action plans related to flooding, watershed management efforts, stream monitoring and assessments, and public education and outreach initiatives.

### ***Current Program Elements***

The County's stormwater management program also consists of dozens of smaller operations that function together to meet the County's stormwater needs. These operations have been divided by functional cost centers to help further identify the many activities within the stormwater program. Table 1 shows how these can be combined into eight (8) functional centers.

**Table 1 – Major Stormwater Management Functional Cost Centers**

<p><b>1. Administration &amp; Management</b>  General Administration  Purchasing  HR Functions  General Program Planning &amp; Development  Budget and Cost Controls  Contract Management  Legal Services  Facilities Management</p> <p><b>2. Special Programs</b>  Public Education/Outreach  GIS, Mapping and Database Management  Inter-Agency Cooperative Activities</p> <p><b>3. Billing and Finance</b>  Billing Operations  Customer Service  Financial Management  Capital Outlay</p> <p><b>4. Watershed Management Planning</b>  Watershed Planning  BMP Development  Comprehensive Monitoring Program</p>	<p><b>5. Engineering &amp; Design</b>  Design Criteria, Standards and Guidance  BMP Analysis &amp; Design  Design, Field and Operations Engineering  Hazard Mitigation  Dam Safety Program  Retrofitting Program  Flood Insurance Program  Community Rating System</p> <p><b>6. Operations &amp; Maintenance</b>  General Maintenance Management  SW Management Facilities Maintenance  Conveyance System Maintenance  General Remedial Maintenance  Emergency Response Maintenance  Infrastructure Management  GASB 34  Field Data Collection (inventory)  Public Drainage System Inspection and Regulation  Private Facilities Inspection &amp; Regulation  Public Assistance/Complaint Response</p>
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<b>4. Watershed Management Planning cont.</b> Stream Protection and Restoration BMP Programs and Activities Used Oil & Toxic Materials Spill Response and Clean Up Program for Public Education & Reporting Illicit or Cross Connections Illegal Dumping Multi-objective Planning Support Zoning Support Landfills and Other Waste Facilities	<b>7. Plan Review and Erosion Control</b> General Code Development & Review Stormwater System Inspections – new dev. Regulatory Enforcement General Permit Administration Erosion & Sediment Control Program  <b>8. Construction Services</b> Capital Improvements Construction Project Management Inspections Land, Easement, and R-O-W Acquisition
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### III. Current Stormwater Management Challenges

While Fairfax County is currently able to direct resources to address a range of stormwater management services, the County also faces significant challenges in establishing and maintaining a holistic, proactive stormwater management program. The County's challenges come in several forms, including regulatory compliance with state and federal water quantity and quality mandates; ensuring proper operation and maintenance of the County's stormwater management infrastructure and Best Management Practices (BMPs); and constructing and maintaining capital projects for the purpose of supporting the County's current watershed planning initiatives and providing the replacement and/or retrofitting of aging stormwater infrastructure as funding allows.

#### Planning Challenges

The County faces a variety of water resource-based mandates, both for water quality and for water quantity management, and currently expends a significant portion of its resources towards compliance with these mandates. Of note, the County must comply with the terms of its Virginia Pollutant Discharge Elimination System (VPDES) stormwater permit for the discharge of stormwater to the County's Municipal Separate Storm Sewer System (MS4). Compliance with the terms of the permit requires that the County meet the minimum control measures for pollution reduction and/or prevention, identified in the permit, to the maximum extent practicable. Activities include water quality monitoring, inspection and maintenance of the stormwater management system, and public education and outreach. Failure to comply can result in fines of up to \$27,500 per day per minimum control measure violation.

Fairfax County is also charged with implementation and enforcement of several other significant water resource-based mandates, including the Chesapeake Bay Preservation Act, which requires that the County enhance management of the riparian areas immediately adjacent to its water bodies with perennial flow. The County's 2002 Stream Protection Strategy (SPS) study provided valuable information on the condition of the County's streams and led to the next phase of stream protection, which was to revise the method to assign Resource Protection Area (RPA) status to local water bodies by using perennial flow for Chesapeake Bay program approval. After receiving State approval of revised perennial stream protocols, the County surveyed (between 2002 and 2003) the headwater reaches of streams to designate perennial streams upstream of the original RPAs that were established in 1993. As a result, the length of the perennial streams in the County increased from over 600 miles to over 800 miles. These changes were



adopted by the Board of Supervisors in 2003 as amendments to the County's Chesapeake Bay Preservation Ordinances.

The County also faces a challenge in planning and eventual implementation of Total Maximum Daily Load (TMDL) plans for pollutants that are identified as violating Virginia's water quality standards, as well as implementation of programs to meet the pollution reduction standards called for in the Potomac/Shenandoah River Tributary Strategy, due out in the fall of 2004. Failure to act on these initiatives could result in the County losing primacy over its compliance programs and being forced to adopt a state or federal compliance protocol with the potential for little or no local input on implementation strategies.

In order to comply with these and other mandated regulations, the County has developed a watershed planning strategy for the study each of the County's 30 watershed sub-basins and that will address many of the compliance strategies required by these regulatory mandates. However, planning alone will not be enough to ensure compliance and move the County's service level forward. Once the watershed plans are developed, the County must be in a position to act on the recommendations established in those plans. The early watershed planning efforts in the Little Hunting Creek Watershed and the Popes Head Creek Watershed have identified a variety of priorities for watershed based initiatives, both structural and non-structural that will not only assist the County with its regulatory compliance mandates, but will move the County's stormwater management program forward by implementing BMPs and/or retrofitting existing structures to more adequately handle the County's stormwater management demand by maximizing the County's value from the initial resource commitment to watershed planning. Currently, the County's capital project implementation capability is limited and can only address the top two, of seven, Board of Supervisors' priorities for stormwater projects: regulatory mandates and home flooding. Implementation of the watershed plans over time will necessitate the development of the County's ability fund initiatives that will address all of the Board's seven project priority classifications.

Fairfax County residents are also relying on the County's stormwater management capability for more assistance in weather-related emergencies. Floodplain management, flood mitigation for residential structures, and pre-and post-flood disaster assistance and recovery assistance have become more prominent in the County in recent months as the tropical storm seasons of 2003 and 2004 have impacted Fairfax County residents.

### Operational Challenges

At present, the majority of the County's infrastructure maintenance and inspection work is driven by regulatory compliance mandates and citizen complaints. At the same time that the County's regulatory mandates and population have grown, the County's stormwater infrastructure has also grown. The table below summarizes the current stormwater infrastructure, including the conveyance and collection system as well as stormwater management facilities, and the various entities responsible for maintaining the system:



		Fairfax County	VDOT	Property Owner
	Pipes	1,400 miles	1,000 miles	200 miles
<b>Conveyance and Collection System</b>	Inlets & Catch Basins	37,000	40,000	8,000
	Improved Channels	25 miles	20 miles	10 miles
	Natural Streams	800 miles	5 miles	400 miles
<b>Stormwater Management Facilities</b>	Onsite Facilities	1,100 facilities	75 facilities	2,200 facilities
	Regional Facilities	45 facilities	4 facilities	15 facilities

As the size of the County's population and infrastructure has grown, the County's ability to provide service for that population and infrastructure has struggled to keep pace. The County does inspect the stormwater infrastructure on a routine basis, but as the system has grown, the rate of inspection has decreased. Currently, Fairfax County inspects roughly 250 to 300 miles of its hard stormwater infrastructure per year, resulting in roughly a five-year inspection cycle. The County also inspects its stormwater management facilities once a year and inspects private stormwater management facilities about once every five years. These inspections often uncover a variety of problems, including tree root damage, collapsed pipes, erosion of endwalls, and piping through dams, all indicators of an aging infrastructure.

MSMD has a stated goal for maintenance of the system to "keep facilities in operational condition for their original purpose(s)." MSMD must limit its maintenance functions, however, to repair and corrections for existing facilities that require no more than three to five crew days per site, due to resource limitations. Maintenance issues that require more effort are either referred to SWPD for capital projects in an emergency (i.e. house flooding) or handled as much as possible in a five-day work assignment and then deferred to a "Replacement Program" which the County does not currently fund.

In addition, as the size of the County's infrastructure and population has increased, so has the time needed to respond to citizen drainage and stormwater complaints. The MSMD has developed a standardized evaluation and priority matrix for stormwater-related complaints. Of the three work priorities established, Work Priority 1 items are considered the most critical (i.e. home flooding, structural endangerment, road flooding, etc.). Between 2002 and 2004, MSMD has experienced a longer response time for these highest priority complaints, from 28.9 days to 41.9 days. Internally, the division's Work Priority 1 completion time goal is from immediate to two weeks.

Investment in capital improvements to the system, those enhancements that either provide new systems of conveyance, storage or treatment of stormwater or enhance the capability of the existing systems to perform such service, is extremely limited, averaging \$2.5 million annually. The need for capital investment in the system is valued in hundreds of millions of dollars. The need for system improvements for stream protection will be identified in the watershed planning process. Completion of a system valuation for the conveyance portion of the infrastructure will add to the value of the backlog. Under





current funding, the known backlog will take a century or two to be built. It is sometimes difficult to grasp the magnitude of the problems.

#### **IV. Projected Program Elements**

To continue the County's current level of service and provide enhancements that meet the intent of a comprehensive, countywide stormwater management program, as well as address the issues that were identified in the current service discussed above, the following enhancements were identified in the initial phase of the Stormwater Needs Assessment Project. These are identified by functional cost center in Table 1 above.

##### **1. ADMINISTRATION**

- Develop and integrate a new, robust work order system to provide coordination and communications between operating units on needs and the action taken as well as provide useful information on the profile of problems, issues and system failures for budget projections. This should include necessary computer hardware, software, and training to ensure maximum efficiency of the system.
- Expand contract management capabilities by consolidating many of these services under an administrative contracts manager to relieve the Project Managers of the paperwork burden, improve effectiveness of the contract process and to increase the efficiency of the Project Management process.
- Establish a section for administration of the stormwater utility, if this funding option is pursued, to provide direct accountability for the tracking and authorization of funds and to manage the billing process.

##### **2. SPECIAL PROGRAMS**

- Increase public education activity to meet regulatory compliance and to increase public understanding of the goals and activities within the overall program, as well as engage them in participating in stormwater program activities.
- Obtain new data application software to allow tracking of multiple, integrated stormwater activities such as BMP installation, site inspection results, enforcement activities, and mitigation opportunities. Build a database management tool to increase staff efficiencies in serving the public and in improving stormwater system performance.
- Update and maintain watershed plans, hydraulic/hydrologic models, and capital improvement prioritization to increase the objective analysis of needs, provide for real-time impact analysis of proposed new development and to balance the needs of each watershed to ensure that funds are expended in a manner consistent with the goals of the Board and the community.
- Update and maintain the GIS impervious data layer to assist in setting priorities and in the on-going analysis of infrastructure condition and performance. This tool is extremely valuable in maintaining a broad array of data on system conditions.
- Update and maintain physical stream assessment inventory and related maintenance activities as one key component in addressing regulatory demands and tracking potential TMDL activities.
- Set-up a grant or cost-share program to retrofit existing private stormwater facilities and to encourage installation of innovative BMPs. This approach can be effective by partnering with private owners of stormwater facilities to improve BMP conditions and performance capabilities.



### **3. WATERSHED PLANNING AND ENGINEERING**

- Organize the Watershed Planning process to improve efficiency and effectiveness in overall planning capability. One senior planner should be assigned to specific watersheds to support implementation of each Plan's recommendations and meet the schedule to have all studies complete by 2010.
- Update and/or develop new BMP design standards that will provide strategies to comply with the regulatory mandates as well as provide appropriate public safety. Once the update is complete, increase level of service to ensure standards are updated in a timely manner.
- Increase use of stream gauges to enhance data collection to support water quality protection program, sediment transport reduction and flood protection activities.
- Complete upgrades or retrofits to recently regional or State designated PL-566 dams and complete design, construction and oversight of backlog of other facility retrofits to ensure that the system under County responsibility is performing effectively.
- Support increase in funding for capital improvement (i.e. design, inspection and contract management/project management) to ensure that the Watershed Plans can be implemented in a reasonable manner.

### **4. OPERATIONS AND MAINTENANCE**

- Perform mowing and routine maintenance of facilities twice per year (increase from current level of service of once per year).
- Upgrade, within the next 10 years, all public stormwater management facilities so that they function properly. This includes management of the program for major pond rehabilitation projects.
- Implement a new dam safety program, including inspection and maintenance activities. Include vegetative management services at these facilities.
- Implement an enhanced enforcement capability to ensure private facilities are operating as designed.
- Increase frequency of the inspection of the storm sewer system so that the system can be managed in a proactive manner, rather than reactive to failures.
- Expand capability to perform storm sewer system upgrades and replacements by implementing an enhanced capability to repair, replace or retrofit components, moving to a proactive management strategy.
- Expand maintenance services to include inspection of and additional work orders on both public and private facilities that will be necessary as new BMPs (LIDs, innovative techniques) are installed.
- Reduce incidence of erosion through new stream "spot" improvements program and erosion control measures.

### **5. CAPITAL CONSTRUCTION**

- Implement capital improvement projects (backlog estimated between \$340 million to \$800 million) over the next 20 to 40 years. These projects will position the County for regulatory compliance and facilitate restoration of the County's streams, 70% of which are in fair to very poor condition.
- Ensure capability of construction inspection and right-of-way acquisition services needed as a result of increase in capital spending.



The measures outlined above are designed to allow the County the ability to move from a reactive stormwater management program with a growing backlog of capital priorities to a more proactive program able to meet its capital, as well as regulatory and maintenance challenges.

*Discussion Topics for the Committee*

1. What should the priorities be for over the next decade, to address system performance in water quality protection and public safety?
2. Is the timing for “buying down” the capital backlog reasonable?
3. The enhancements outlined above provide for maintenance capability to not only provide better service to the infrastructure and stormwater BMPs already in the ground, but also to maintain new capital projects that come about as a result of the program over time. What principles should drive the expansion of maintenance services?
4. How should the County ensure the proper operation and maintenance of County-owned and privately held stormwater infrastructure and BMPs? Is regulation and enforcement sufficient? When should the County take responsibility directly for maintenance of the system?

